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DEVELOPMENT OF  
A PROCEDURE FOR  
DETERMINING WILDERNESS CAPACITY

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Title: Development of a Procedure for Determining Wilderness  
Capacity

Abstract

The White River National Forest administers all, or portions of seven designated wilderness areas. Proper management of these areas dictates that carrying capacity limitations be developed for each of these areas. This paper details the procedure used to develop a system for calculating capacities based on direction given in the "Land and Resource Management Plan" for the White River National Forest.

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## CHAPTER I

### INTRODUCTION AND STATEMENT OF PROBLEM

#### Introduction

Over thirty percent of the White River National Forest is currently designated as wilderness and is composed of all or portions of seven Wildernesses: Collegiate Peaks, Eagles Nest, Holy Cross, Hunter-Fryingpan, Maroon Bells-Snowmass, Flat Tops, and the Raggeds. The total combined acreage of the wildernesses that are directly administered by the White River Forest is 712,000 acres.

Although these areas are all uniquely different, they share the same magnetism that draws ever increasing numbers of visitors to their boundaries. The number of visitors varies greatly among the areas, but each is displaying more evidence of human activities each year. Also, as the financial value of recreation pursuits becomes more apparent, the demand for commercial uses (outfitter/guides) of the wildernesses is skyrocketing. This service is a major contributor to the increasing human use of the areas by attracting visitors who may not otherwise have the desire or ability to visit the areas independently.

In all White River Forest Wildernesses, again in varying degrees and scope, certain areas are receiving such intensive use that resource damage is occurring. This damage is exhibited by



compacted soil, erosion, loss or injury of both overstory and ground vegetation, and deterioration of trails. In many cases a serious loss in the opportunity for solitude has also occurred.

The final Land and Resource Management Plan, White River National Forest was approved in 1984. This plan states there is a need for uniform management of the Forest's wildernesses. Guidance is given in the Forest Management Area Direction sections of the plan. Forest Direction consists of goals, objectives, and management requirements which are applicable to wilderness as a whole. Management Area Direction contains requirements specific to individual areas within the wildernesses. Both sections contain guidance concerning what is acceptable capacities and resource disturbance.

#### STATEMENT OF PROBLEM

Despite the 1984 approval of the White River National Forest Land Use Plan, a large degree of variation exists among wilderness managers in individual interpretations of what acceptable levels of wilderness use are.

Determination of accurate, defensible and uniform carrying capacities are vital to proper Wilderness management. Not only are these figures necessary to insure that resource and social values are protected, but they are also key in making other management decisions. Examples are: Outfitter/guide allocations, campground expansion or construction adjacent to wilder-

nesses, trail and trailhead planning, transportation system planning, and even recommendations given to the State Division of Wildlife concerning hunting seasons.

The purpose of this study is to recommend a methodology to be used in establishing wilderness recreation capacities on the White River National Forest.

### HYPOTHESIS

This paper will provide a system for determining Wilderness capacities that will: 1) be relatively easy to implement, 2) be used by all White River Forest Districts to determine wilderness capacities, 3) be useable within present budget constraints, and 4) will provide capacity estimates within one year of implementation.

### DELIMITATIONS

This study will be conducted using currently available research data. It will not attempt to display any revolutionary new insight into the already well researched and discussed topic of wilderness capacities. Rather, its purpose is to merely develop a system for calculating capacities using current knowledge and direction.

The procedure will be developed to meet the needs of the White River National Forest. Any value that it may have to other National Forests will be purely coincidental.

## DEFINITIONS

For the purposes of simplification and clarification of the paper, the following words are defined:

Plan - Unless otherwise noted, will be the final Land and Resource Management Plan, White River National Forest.

Wilderness - Will be used in reference to all designated Wilderness areas administered by the White River National Forest.

Use - Will refer to all human recreational activities occurring within the Wilderness.

Prescription Area - A large area within a wilderness that is managed to meet certain criteria.

Pristine Area - A prescription area that is managed for the protection and perpetuation of essentially pristine biophysical conditions and a high degree of solitude. Past evidence of human use is not noticeable.

Primitive Areas - A prescription area that is managed for the protection and perpetuation of natural biophysical conditions. On-site regulation of recreation use is minimal, as is use. Evidence of human use is limited. High opportunity for solitude.



Semi-primitive Area - A prescription area that is managed for the protection and perpetuation of essentially natural biophysical conditions. Evidence of human use is limited and site specific. Moderate opportunity for solitude.

High Use Area - A prescription area that is managed for the protection and perpetuation of essentially natural biophysical conditions. Human use is characterized by large numbers of day users. Low opportunity for solitude.

Compartment - A specifically designated area of use within a prescription area.

Forest - White River National Forest

#### BASIC ASSUMPTION

For the purpose of this study, it is assumed that the direction and guidelines given in the "Plan" are correct and based on sound research and public involvement. Therefore, no further proof of its validity is necessary.

## CHAPTER II

### REVIEW OF LITERATURE

In order to develop a methodology for determining wilderness capacities, it was necessary to review various papers and research that, in total, led to the management direction given in the "Plan". In doing this it was quickly discovered that recreation carrying capacity is a very popular topic, with well over 200 publications dedicated to the subject.

Most of the literature is very general in nature. Rather than describing a process for determining capacity, most authors prefer to talk about what the desired end results are and even these tend to be non-specific. Statements describing carrying capacities such as the following are common: "The amount and character of use an area can sustain within a specified time period without causing unacceptable change to the physical environment or to the experience of the user." (Lime, 1975).

Most literature sources agree that there are three basic considerations in determining capacity. They are: 1) management objectives, 2) social aspects, and 3) impacts on the physical and biological environment.

Of the studies that discuss management objectives, there appears to be agreement that these objectives must be set by wilderness managers using the following criteria: 1) Objectives must be

based on the intent of the Wilderness Act of 1964, and 2) they cannot be based on any hard and fast rule, but must be determined by managers using their best estimates of what kind of experiences are being sought and how much use an area can tolerate.

Literature regarding the social values of carrying capacity clearly points out one fact - there is a wide range of "acceptable" social carrying capacity. This is illustrated by research done by Stankey (1980) in conducting a capacity survey in two different wilderness areas. He found that in the more heavily used areas, visitors were more tolerant of encounters with other parties than in the low use area. However, campsite solitude was important to users of both areas.

Impact on the physical and biological environment is the easiest to quantify. In a paper done by Frissell (1978) a classification system was presented that inventoried the condition of wilderness campsites. This system has been widely accepted, and provides a system of measures for levels of change.



## CHAPTER III

### PROCEDURES

As illustrated in the literature review, no specific formula has been developed by researchers to determine wilderness carrying capacities. There is agreement, however, that capacity must be calculated using the managers best understanding of what the social, physical, and biological considerations are and by then developing management objectives accordingly. These tasks were completed and documented by final adoption of the "Final Environmental Impact Statement" and the "Land and Resource Management Plan for the White River National Forest."

This chapter will deal with the approach used to develop a methodology (system) for determining capacity on White River National Forest Wilderness.

### APPROACH

#### Formulative Stage

The first step in the system development was to define what wilderness managers needs were. This process was started in August 1984 at a White River Forest Wilderness Managers workshop. At that time, the need for establishing capacities

was first expressed as a Forest priority. At this workshop a task force, with representatives from five ranger districts, was formed. Each task force member was given the following assignments: 1) Review all applicable portions of the Forest Plan and EIS, 2) Conduct literature searches, 3) Contact other Forests for ideas, and 4) Conduct meetings with other wilderness managers from their own ranger districts to develop a list of goals and objectives for the system.

#### Information Consolidation

All information collected by individual members was presented to the group (November 16, 1984). Evaluation of this information was done by the group, and a consensus arrived at regarding what was relevant to the project.

#### Goals and Objectives

Goals and objectives that had been individually developed by the different ranger districts were presented to the group. Discussion by the group followed and goals and objectives for the project were agreed upon.

#### Test Case

The next step in the process involved using the information presented and the established goals and objectives to develop a system model. This model was developed with the understanding that: 1) it would be as simple and concise as possible, 2) it



was considered a starting point only, and 3) refinements would be made as weaknesses and additional needs presented themselves during testing.

Each task force member was asked to test the model system on a wilderness prescription area and report their findings. Results expected were: 1) identification of strengths and weaknesses, and 2) suggestions for improvement.

The system model is displayed and described in Appendix C.

### Conclusions and Recommendations

A final meeting of the task force was held on December 13, 1984. At this meeting test results were reported and suggestions for improvement made. Final refinements were made on the system and a schedule of implementation created.

The system was presented to the Forest Management Team (Forest Supervisor and District Rangers) on January 10, 1985. It was approved for use on the White River Forest at that time.



## Chapter IV

### ANALYSIS OF DATA

This chapter will be used to display the results of the procedures discussed in Chapter III.

#### INFORMATION ANALYSIS

Literature Search - Review of the volumes of literature on the topic of wilderness capacity. Apparently, the most widely accepted definition of carrying capacity is "The amount and character of use an area can sustain within a specified time period without causing unacceptable change to the physical environment or to the experience of the user." (Lime, 1975).

No literature was found that was able to quantify what "unacceptable change" is. The general consensus among the various authors was that wilderness managers must determine capacities by establishing management objectives based on their best judgement of what acceptable social and physical changes are.

A summary of relevant information and needs discovered during the literature search is:

1. There is no quantitative definition of what "unacceptable change" is for either the social or physical environment.

2. There are at least two methods of measuring change to the physical environment (Frissell and Cole).

3. Past methods of measuring change to the social environment have been based on user satisfaction surveys. Their value is questionable, since there is such an extreme range of data. It is quite obvious that what is solitude for one individual is a crowd to another.

4. There is no magic formula to use in determining capacity. The wilderness manager must set objectives based on public and inhouse input and on the best biological information he can obtain.

Forest Plan - The Forest Plan states there is a need for uniform management direction among the different Wildernesses. It also recognizes that these areas will not be able to meet demand by the year 2000. Management direction given is, in part, based on these two assumptions.

In the Forest Plan, wilderness is categorized into four recreation opportunity classes (prescription areas). They are pristine, primitive, semi-primitive and high density use. These areas differ in the degree of user opportunities for solitude, perceptible evidence of past human use and extent of trail development. Management direction was well described for each area.

Three factors of the Forest Plan that were considered critical to the project are: 1) It supplied direction that defined acceptable use in a quantifiable manner, 2) The plan recognized that among different users there is a wide range of acceptable levels of solitude, and 3) It furnished a mechanism for providing a range of recreation opportunities within each wilderness (prescription areas).

### Goals and Objectives

The goals and objectives chosen by the task force for the development of a procedure to calculate capacities were developed to meet specific Forest needs. They are:

1. To be defensible, the capacity figures produced must be developed based on the direction given in the Forest Plan.
2. The system must be developed, tested, implemented and be furnishing capacity figures prior to the 1985 field season.
3. It must be useable under current budget constraints.
4. It must be able to provide consistent results when applied by people of different skill levels, backgrounds and personal beliefs on Wilderness theory.



## System Test

The test model was developed using the information presented in the literature search as background and according to the goals and objectives that were established.

It was the consensus of the task force that development of the Forest Plan had met the basic requirements for establishing capacities, since the Plan was based on public, technical specialist and wilderness manager input.

The model was developed by: 1) concisely displaying all guidelines from the Forest Plan, and 2) suggesting a method for doing the calculations by category for each prescription area (trail encounters per day, trail use by PAOT, area wide use by PAOT, total occupied campsite density by number of sites and condition class and maximum trail miles allowed).

Test application of the model indicated that the basic procedure was good and it would satisfy the stated objectives.

The only major weakness of the system that presented itself during testing was its inability to address areas of high visitor impacts (usually destination points) within the large prescription area. It was clear that the total allowable use for an entire prescription area could not be allowed to occur in just one or two relatively small portions of that area.

## Conclusions

It was concluded by the task force that, with only one major revision, the model system should be adopted for use on the Forest.

The revision necessary to upgrade the procedure was to delineate areas of high use within the prescription areas. These areas would be referred to as compartments. Capacities for these compartments would be calculated using the guidelines for the prescription area that they lie within. Criteria for drawing compartment boundaries is shown on page 29 of the "Procedure for Capacity Determination, White River National Forest" (Appendix D).

## Chapter V

### Summary And Conclusions

Allowable capacities within Wilderness areas on the White River Forest have never been determined using a formalized procedure that considered both social and physical environments. When attempts have been made to manage use, they have been based on the "gut feeling" of managers on what social values should be, or solely on observations of physical damage to the resource. In some instances damage to the physical environment caused by overuse has been dealt with by increased trail maintenance and designation and hardening of campsites rather than considering the capacity limitations of the area.

Adoption of the White River Forest Plan gave managers an added tool to use in determining proper Wilderness capacities. As true with all tools, instructions for use are necessary. The purpose of this paper is to develop a system to provide those instructions.

### Summary of Procedures and Findings

Brifely stated the procedure used in development of a system for determining Wilderness capacities was the formation of a task force to:

1. Identify the need for such a system.



2. Research pertinent literature on the topic of carrying capacity and review application sections of the Forest Plan.
3. Identify the goals and objectives of the system, ie., what do Wilderness managers want the system to do.
4. Develop and test a system model using managers' goals and objectives, information discovered from the literature search and direction from the Forest Plan.
5. Analyze the results of the system model and upgrade or change the system as additional needs are discovered.

Findings of the group were that a procedure for determining Wilderness capacities could be developed that was based on and supported by the guidelines and direction given in the Forest Plan.

### Conclusion

Based upon the findings and within the limitations of this study, capacities for White River National Forest Wildernesses can be calculated using the system developed and tested by the Wilderness capacities task force. Capacity figures derived from the procedure are reasonable and defensible.

### Discussion and Implications

Capacities calculated using this method are in no way perfect. People and groups will argue that they are either too high or too low, depending on their own special interest. It is quite possible that convincing arguments can be made for either adjusting the figures up or down on the same area, depending on the proponents viewpoint. For this reason it is important that the system be implemented as developed. Reasons for this are: 1) use of the system removes personal bias from capacity decisions, and 2) the system was developed using direction and guidelines from the Forest Plan, a document based on massive amounts of public and inservice input. This makes the capacity figures as defensible as possible.

Application of this procedure is an important first step in assuring Forest Plan direction is met.

### Recommendations

It is recommended that White River National Forest Wilderness Managers use the procedure developed by this project to set capacity limitations. It is also recommended that the procedure be monitored, evaluated and refined as necessary.

## CHAPTER VI

APPENDIXA. Literature Cited

Frissell Sidney, J. 1978. Judging Recreation Impacts on Wilderness Campsites. Journal of Forestry. 76:481-483

Lime, David W. 1975. Principles of Recreational Carrying Capacity. In the proceeding of the Southern States Recreation Research Applications Workshop, Southeastern Forest Experiment Station, Forest Service, USDA, Ashville, N.C.

Stankey, George M. 1980. A Comparison of Carrying Capacity Perceptions Among Visitors to Two Wildernesses. USDA Forest Service, Intermountain Forest and Range Experiment Station, Ogden, Utah.

B. Task Force Members

Members of the task force that developed the procedure for determining wilderness capacity were:

Linn Pettijohn (chairman) - Forester, Blanco Ranger District, White River National Forest

Craig McGuire - Recreation Technician, Aspen Ranger District, White River National Forest



Bruce Fahrni - Recreation Forester, Dillon Ranger District,  
Arapaho National Forest (Administered by the White River  
National Forest)

Jerry Craighead - Wilderness Technician, Eagle Ranger  
District, White River National Forest

Gary Osier - Forester, Rifle Ranger District, White River  
National Forest

Bill Johnson - Recreation Technician, Eagle Ranger  
District, White River National Forest

### C. TEST SYSTEM MODEL

This appendix displays the test system that was used to develop and refine the final procedure.

### TEST MODEL - CALCULATION OF CAPACITY

Using the attached fact sheet and sample format, calculate maximum capacity limits for one prescription area within a wilderness on your district. Please follow these instructions:

1. Calculate capacities on the entire area, do not separate the areas into smaller compartments.
2. Use Forest Plan overlays to determine acreages of the various vegetation types.
3. Do not reduce the use levels to reflect usable acres except in High Density prescription areas (WRFMP Chapter III, page 215).

After you have figured capacities for your area, please answer the following questions:

#### QUESTIONS

1. What is the "most limiting factor" above?
2. Does the "most limiting" limit enough?
3. With your knowledge of the area, do the capacity limits appear reasonable?
4. What additional information do we need?



5. Does this system meet the stated objectives?
6. What changes are necessary?

#### OBJECTIVES

- A. To develop an inventory system that will provide adequate information on Wilderness capacities to insure that Forest Plan Standards and Guidelines are being met.
- B. To develop a system that compliments the Forest Plan when it does not fully address local problems.
- C. Can be used by all Districts within budget constraints.
- D. Will be capable of providing this information within one year of implementation (or keep it simple).

Prescription Area	Trail & Camp Encounters	Trail Use*		Area Wide*		Occupied Campsite Density					Trail Density	Campsite Frissell Class
		Open Land	Forest	Open	Forest	Lakes ≤ 5 ac	5-25ac	> 25ac	Streams & Trails Open	Forested		
<u>Pristine (8A)*</u> Manage to provide infrequent contact with group or individuals and protection of pristine biophysical conditions	2 per day during peak use	NO constructed trails		.001 -.002 PAOT/ acre	.003- .007 PAOT acre	-----	-----	-----	-----	-----	-----	1 & 2
		(O/G use limited to one party per 2,500 acres)										
<u>Primitive (8B)*</u> Manage for protection and perpetuation of natural biophysical conditions. Minimal on-site regulation.	Less than six/day during peak use (reduce use when it exceeds 10% of the days in summer & fall)	.5 - 1.0 PAOT/mi.	2 - 3 PAOT/ mile	.002 -.005 PAOT/ acre	.01- .02 PAOT/ acre	2 sites	3 sites	4 sites	2 sites/ mile	4 sites/ mile	1 mile/sq. mile	1 & 2
<u>Semi-Primitive (8C)*</u> Manage for protection and perpetuation of essentially natural biophysical conditions. Campsites show signs of repeated, but acceptable levels of use.	Less than 20/day during peak use (reduce use when it exceeds 20% of days during summer use season).	2 - 3 PAOT/mi.	9 - 11 PAOT/ mile	.004 -.008 PAOT/ acre	.05- .08 PAOT/ acre	2 sites	3 sites	4 sites	3 sites/ mile	6 sites/ mile	2 mile sq. mile	3
<u>High Density (8D)</u> Manage for protection and perpetuation of essentially natural biophysical conditions. Human use is characterized by large numbers of day users.	Less than 20/day	-----	-----	.04- .08 PAOT/ acre	.5- .8 PAOT/ acre	4--- 100' between campsites	100' between campsites		---a		may exceed 2 miles/ sq. mi.	4
		(O/G use only through travel during summer season)										

General Direction (page III-20)

- (03) Utilize a permit system to manage use levels and patterns during the summer use period based upon the following criteria:
- When acceptable use levels, as specified in the prescriptions, are exceeded during 20% of the summer use season, or,
  - When acceptable capacities in primitive or pristine management areas are exceeded on 10% or more of the days during the summer use season.
  - Apply a permit system to an entire wilderness, not just impacted portions of a wilderness.

- (04) Do not impose party-size limits during traditionally light use seasons or during fall hunting seasons unless necessary to prevent unacceptable levels of change to the biological and physical resources.

\* Manage O/G operations in the same manner as other visitors. Permit camping only in sites specified in O/G permits. Keep out-filter guide activities harmonious with activities of non-guided visitors. Include in calculations of level of use capacities.

	Open	Forested
* Use higher number for (lower # for all other)	Rock, Mtn. Grass	Spruce/fir Lodgepole Pine Aspen

This table is a summary of information and direction given in the White River Forest Land Management Plan.



SAMPLE8C Area (Skinny Fish - McGinnis Area)DATA

		<u>Trail Mileage</u>	<u>Square Miles Total</u>
Total acres	- 1,435	"Open" - .8 miles	<u>2.24 miles<sup>2</sup></u>
"Open" acres	- 150	"Forested" 2.0 miles	
"Forested" acres	- 1,216	2.8 total miles	

Lakes

Skinny Fish	39 acres	
Elk	3 acres	<u>Stream Mileage</u>
Margaret	3 acres	"Open" - .45 miles
McGinnis	24 acres	"Forested" - 1.75 miles
		<u>2.20</u>

(in this area all "open" is Mountain grass and all "Forested" is S/F, LPP or Aspen)

FOREST PLAN GUIDELINES

Trail Encounters - 20/day

Trail Use

Open land:	3 PAOT/mile x .8 miles =	2.4 PAOT for area
Forest land:	11 PAOT/mile x 2.0 miles =	<u>22.0 PAOT for area</u>
Total:		24.4

Area Wide Use:

Open land:	.008 PAOT/acre x 150 acres =	1.2 PAOT total
Forest land:	.08 PAOT/acre x 1,216 acres =	<u>97.3 PAOT total</u>
		98.5

Occupied Campsite DensityLakes

Skinny Fish	4 sites
Elk	2 sites
Margaret	2 sites
McGinnis	4 sites
	<u>12 sites</u>



Streams & Trails

"Open" (stream .45 miles + .8 miles trail)  
 1.25 miles x 3 sites/mile = 4 sites

"Forested" (stream 1.75 miles + 2.0 miles trail)  
 3.75 miles x 6 sites/mile = 23 sites  
 27 sites

Trail Density Allowed

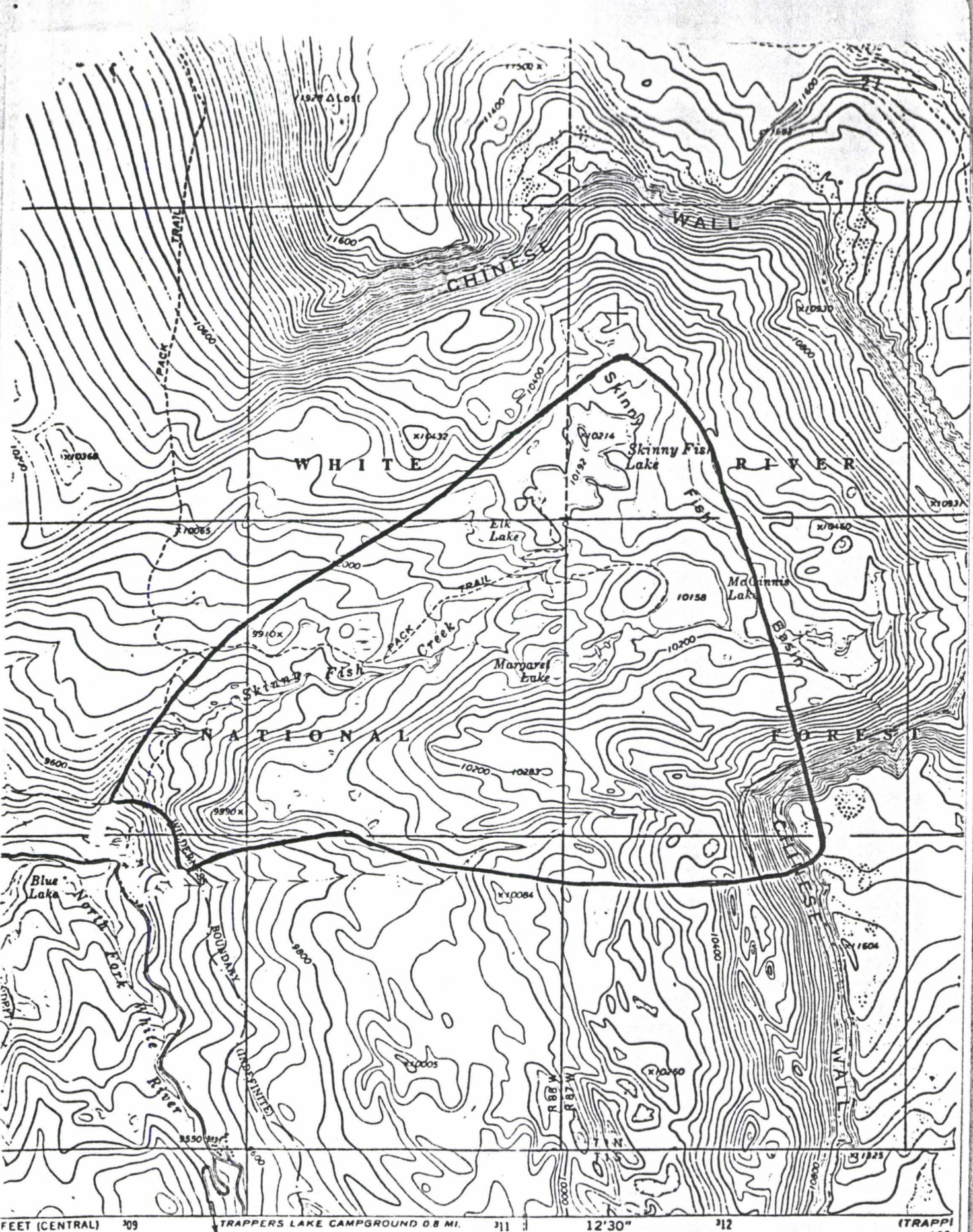
2.24 square miles x 2 miles = 4.5 miles of trail allowed

Frissell's Class of Campsite - 3 or better (ground vegetation lost on most of the site, but lumnus and Titter still present in all but a few areas).

SUMMARY OF TOTALS

Trail Encounters	20/day
Trail Use	24.4 PAOT
Area Wide Use	98.5 PAOT
Total Occupied Campsite Density (Lakes, streams & trails)	39 sites
Trail Mileage Allowed (existing is 2.8)	4.5 miles





FEET (CENTRAL) 309 TRAPPERS LAKE CAMPGROUND 0.8 MI. 311 12'30" 312 (TRAPPI 456.

ted, and published by the Geological Survey  
S, NOS/NOAA, and U.S. Forest Service

4

SCALE



D. FINAL "PROCEDURE FOR CAPACITY DETERMINATION, WHITE  
RIVER NATIONAL FOREST"



## PROCEDURE FOR CAPACITY DETERMINATION, WHITE RIVER NATIONAL FOREST

The following procedure has been approved for use on the White River National Forest. It is intended to provide a consistent and unbiased method for calculating wilderness capacity limitations. It is based entirely on direction given in the Forest Plan, thereby removing as much personal bias and inconsistency between units as possible. Although it is recognized that a "recipe book" approach will never replace the need for professional judgement and interpretation, it is felt that this approach will provide a sound, defensible foundation for management decisions.

### Criteria for Delineating Compartment Boundaries

The first step in capacity determination is to delineate compartment boundaries within Forest Plan prescription areas, where necessary. These compartments will show areas of high use within the prescription area (usually destination points). Criteria for drawing boundaries is:

1. The Forest Plan prescription must be uniform throughout the compartment.
2. Use patterns within the compartment should be similar.

3. The topography of the compartment should be uniform.
4. Travel routes and entrance portals to the area should be homogeneous.

Generally speaking, the boundary lines for the compartments are drawn by the wilderness visitors when they chose to camp in a particular area.

Compartment size can range from 10 acres up to the entire prescription area. Characteristically the small compartments show intensive high impact use, while the larger compartments have little or no use.

The adjustment of a compartment boundary to ease overcrowding or to expand capacity is not a valid exercise.

#### Acreage Determination by Vegetation Type

After compartment lines are drawn, acreages for each vegetative type within the compartment must be calculated. The vegetation type map overlays developed for the Forest Plan should be used for these calculations (code definitions are attached).

# CAPACITY FORMULAS

## Area Wide Capacity

Veg Class  
Net Acres    x    Capacity Coefficient    =    People at One Time (PAOT)

### Veg Class

#### OPEN

I = Alpine Grasses/Krummholz

II = Rock/Other Mountain Grasses/Not Stocked

#### FORESTED

III = Shrub/Brush/Ponderosa/Doug Fir/White Pine/Riparian

IV = Spruce/Fir/Lodgepole/Aspen

### Capacity Coefficients

#### Prescription

#### Veg Class

#### Coefficient <sup>1/</sup>

8A	I	.001
8A	II	.002
8A	III	.003
8A	IV	.007
8B	I	.002
8B	II	.005
8B	III	.01
8B	IV	.02
8C	I	.004
8C	II	.008
8C	III	.05
8C	IV	.08
8D	I	.04
8D	II	.08
8D	III	.5
8D	IV	.8

Veg Class Net Acres = Total acres of veg class in compartment (-) Trail  
exclusions (-) Stream exclusions (-) Lake buffer

feet of trail in veg type for compartment (x) 200 ft  
exclusion zone

\*Trail/Stream Exclusion Acres =  $\frac{43,560 \text{ ft}^2}{\text{feet of trail in veg type for compartment (x) 200 ft exclusion zone}}$

\*Must be calculated for each veg type in the compartment.

\*\*Based on Supervisors order prohibiting camping within 100' of trail or stream

Area Wide Capacity = Veg Class I PAOT (+) Veg Class II PAOT (+) Veg Class III  
PAOT (+) Veg Class IV PAOT

<sup>1/</sup> These coefficients are derived from information and direction given in the White River FLMP.



Occupied Campsite Density (OCD) Area Wide

OCD = Miles of streams and/or trails (x) acreage (x) coefficient\*

\*Use same veg class coefficient as for Area Wide Capacity

TRAIL USE PAOT

Miles of Trail (x) Trail Use Coefficient = Trail Use PAOT for Veg Class

Trail Use Coefficients Prescription	Veg Class	Coefficient <sup>1/</sup>
8B	I	.5
8B	II	1.0
8B	III	2.0
8B	IV	3.0
8C	I	2.0
8C	II	3.0
8C	III	9.0
8C	IV	11.0

There are no constructed trails in 8A prescriptions and capacity is reached in 8D prescriptions when trail encounters exceed 20 parties per day.

Total trail Use PAOT = Veg Class I PAOT(+)Veg Class II PAOT(+)Veg Class III PAOT(+) Veg Class IV

STREAM/TRAIL DENSITY

Miles of Streams/Trails (x)Camps per Mile(x)Avg. Party Size=Stream/Trail Density

Prescription	Veg Class	Camps per mi.
8B	I/II open	2
8B	III/IV	4
8C	I/II open	3
8C	III/IV	6
8D	maintain 100 ft. between camps	

LAKE DENSITY

No. of allowable sites (x) Avg. Party Size = Lake Density

Lake Size	No. of Allowable Sites (8B and 8C only)
5 acres	2
5-25 acres	3
25 acres	4

Average Party Size-Depends on data available, best use is compartment specific data, then wilderness data for individual ranger districts, then wilderness wide

<sup>1/</sup> These coefficients are derived from information and direction given in the White River FLMP.

### LIMITING CAPACITY

Usually the smallest of the various capacities, except compartments where lakes are the dominate feature, then the lake density may be used. Local conditions may justify other adjustments.

### DOCUMENTATION

It is critical that all capacity calculations be documented and recorded. The two forms immediately following are the suggested format for this.



COMPARTMENT: \_\_\_\_\_

PRESCRIPTION: \_\_\_\_\_

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DATA

Open Lands

Type A: Alpine \_\_\_\_\_ ac

Krummholz \_\_\_\_\_ ac

Total A \_\_\_\_\_ ac

Type B: Rock \_\_\_\_\_ ac

Mtn Grass \_\_\_\_\_ ac

Total B \_\_\_\_\_ ac

Total Acres \_\_\_\_\_

\_\_\_\_\_ Square Miles

Forest & Shrub Lands

Type C: Pond/D Fir \_\_\_\_\_ ac

Riparian \_\_\_\_\_ ac

Mixed Br \_\_\_\_\_ ac

Total C \_\_\_\_\_ ac

Type D: Aspen \_\_\_\_\_ ac

Lodgepole \_\_\_\_\_ ac

Spruce/Fir \_\_\_\_\_ ac

Dead Stand \_\_\_\_\_ ac

Total D \_\_\_\_\_ ac

Trail Mileage

"Open" \_\_\_\_\_ miles

"Forested" \_\_\_\_\_ miles

\_\_\_\_\_ Total miles

Stream Mileage

"Open" \_\_\_\_\_ miles

"Forested" \_\_\_\_\_ miles

\_\_\_\_\_ Total miles

Lakes

\_\_\_\_\_ ac

\_\_\_\_\_ ac

\_\_\_\_\_ ac

Total \_\_\_\_\_ ac Lakes

FOREST PLAN CAPACITIES

Trail Encounters- \_\_\_\_\_ /day

Trail Use

Open Lands: PAOT/mile x

miles = PAOT for area

Forested Lands: PAOT/mile x

miles = PAOT for area

Total

Area Wide Use

Open Land: A PAOT/acre x

acres = PAOT total Type A

B PAOT/acre x

acres = PAOT total Type B

Forested Land: C PAOT/acre x

acres = PAOT total Type C

D PAOT/acre x

acres = PAOT total Type D

Total

Occupied Campsite Density

Lakes

\_\_\_\_\_ acres

sites

\_\_\_\_\_ acres

sites

\_\_\_\_\_ acres

sites

\_\_\_\_\_ Total sites

Streams & Trails

"Open" (\_\_\_\_\_ stream mi + \_\_\_\_\_ trail mi) \_\_\_\_\_ mi x \_\_\_\_\_ sites/mi = \_\_\_\_\_ sites

"Forest" (\_\_\_\_\_ stream mi + \_\_\_\_\_ trail mi) \_\_\_\_\_ mi x \_\_\_\_\_ sites/mi = \_\_\_\_\_ sites

Trail Density Allowed (\_\_\_\_\_ miles/sq. mile)

\_\_\_\_\_ sq. miles x \_\_\_\_\_ miles = \_\_\_\_\_ miles of trail allowed



COMPARTMENT: \_\_\_\_\_

PRESCRIPTION: \_\_\_\_\_

SUMMARY OF CAPACITIES

Trail Encounters

Trail Use

Area Wide Use

Total Occupied Campsite Density  
(Lakes, Streams and Trails)Trail Mileage - Existing \_\_\_\_\_ miles  
- Allowed \_\_\_\_\_ milesOutfitter/Guide Camps - Current \_\_\_\_\_  
- Historical \_\_\_\_\_Outfitter/Guide Day Use - Current \_\_\_\_\_  
- Historical \_\_\_\_\_

% of Capacity Allocated to Outfitter/Guide \_\_\_\_\_

\_\_\_\_\_/Day

\_\_\_\_ PAOT (Persons at one  
time )

\_\_\_\_ PAOT

\_\_\_\_ Sites

\_\_\_\_ miles

\_\_\_\_ Camps

\_\_\_\_ Camps

\_\_\_\_ PAOT

\_\_\_\_ PAOT

\_\_\_\_ %

NARRATIVE:

Prescription Area	Trail & Camp Encounters	Trail Use*		Area Wide*		Occupied Campsite Density			Streams & Trails		Trail Density	Campsite Prissell Class
		Open Land	Forest	Open	Forest	Lakes < 5 ac	5-25ac	> 25ac	Open	Forested		
<u>Pristine (8A)*</u> Manage to provide infrequent contact with group or individuals and protection of pristine biophysical conditions	2 per day during peak use	NO constructed trails		.001 -.002 PAOT/ acre	.003 .007 PAOT/ acre	-----	-----	-----	-----	-----	-----	1 & 2
(O/G use limited to one party per 2,500 acres)												
<u>Primitive (8B)*</u> Manage for protection and perpetuation of natural biophysical conditions. Minimal on-site regulation.	Less than six/day during peak use (reduce use when it exceeds 10% of the days in summer & fall)	.5 - 1.0 PAOT/mi.	2 - 3 PAOT/ mile	.002 -.005 PAOT/ acre	.01-.02 PAOT/ acre	2 sites	3 sites	4 sites	2 sites/ mile	4 sites/ mile	1 mile/sq mile	1 & 2
<u>Semi-Primitive (8C)*</u> Manage for protection and perpetuation of essentially natural biophysical conditions. Campsites show signs of repeated, but acceptable levels of use.	Less than 20/day during peak use (reduce use when it exceeds 20% of days during summer use season).	2 - 3 PAOT/mi.	9 - 11 PAOT/ mile	.004 -.008 PAOT/ acre	.05-.08 PAOT/ acre	2 sites	3 sites	4 sites	3 sites/ mile	6 sites/ mile	2 mile sq. mile	3
<u>High Density (8D)</u> Manage for protection and perpetuation of essentially natural biophysical conditions. Human use is characterized by large numbers of day users.	Less than 20/day	-----	----	.01-.08 PAOT/ acre	.5-.8 PAOT/ acre	4----	100' between campsites	----	----	----	may exceed 2 miles/ sq. mi.	4
(O/G use only through travel during summer season)												

General Direction (page III-20)

- (03) Utilize a permit system to manage use levels and patterns during the summer use period based upon the following criteria:
- When acceptable use levels, as specified in the prescriptions, are exceeded during 20% of the summer use season, or,
  - When acceptable capacities in primitive or pristine management areas are exceeded on 10% or more of the days during the summer use season.
  - Apply a permit system to an entire wilderness, not just impacted portions of a wilderness.

- (04) Do not impose party-size limits during traditionally light use seasons or during fall hunting seasons unless necessary to prevent unacceptable levels of change to the biological and physical resources.

\* Manage O/G operations in the same manner as other visitors. Permit camping only in sites specified in O/G permits. Keep out-fitter guide activities harmonious with activities of non-guided visitors. Include in calculations of level of use capacities.

* Use higher number for (lower # for all other)	Open	Forested
	Rock, Mtn. Grass	Spruce/fir Lodgepole Pine Aspen



WHITE RIVER NATIONAL FOREST LAND MANAGEMENT PLANNING  
R2MAP DATA BASE DICTIONARY

CLASS NUMBER: 050

CLASS NAME: Existing Vegetation

SCALE: 1:24,000

DEFINITION: This R2MAP class has all lands classified by existing vegetation type, each with a four digit map code and two digit R2MAP computer code. The classification is based on composition, size class, and crown density of overstory vegetation. A ten acre minimum was used for all types of vegetation except for mountain meadows, which were delineated where visible on the aerial photos. Crown Density is described as poorly, moderately, or well stocked (P, M, or W).

INSTRUCTIONS: This class is derived directly from existing vegetation maps and is directly coded on to R2MAP coding forms and loaded into R2MAP by a LANDUP program. This class is used to develop existing vegetation aggregations which then are used to develop potential vegetation. This class is also used to develop site types for each capability area.

CODES:	<u>Class 050 Code</u>	<u>Map Code</u>	<u>Existing Vegetation</u>
	A1	A7P	Aspen 7P
	A2	A8P	Aspen 8P
	A3	A9P	Aspen 9P
	A4	A7M	Aspen 7M
	A5	A8M	Aspen 8M
	A6	A9M	Aspen 9M
	A7	A7W	Aspen 7W
	A8	A8W	Aspen 8W
	A9	A9W	Aspen 9W
	AX	A7	Aspen 7M
	AY	A8	Aspen 8M
	AZ	A9	Aspen 9M
	TT	AL	Alpine Grasses
	QQ	AW	Alpine Willow
	CC	AG	Agricultural Lands
	IA	DS	Dead Spruce w/SF7 or None
	IB	DS	Dead Spruce w/SF8
	IC	DS	Dead Spruce w/SF9P
	ID	DS	Dead Spruce w/SF9MW
	DD	X	Disturbed Area
	DN	NS	Non-stocked



## CLASS 050 (Con't.)

<u>Class 050 Code</u>	<u>Map Code</u>	<u>Existing Vegetation</u>
F1	DF7P	Douglas Fir 7P
F2	DF8P	Douglas Fir 8P
F3	DF9P	Douglas Fir 9P
F4	DF7M	Douglas Fir 7M
F5	DF8M	Douglas Fir 8M
F6	DF9M	Douglas Fir 9M
F7	DF7W	Douglas Fir 7W
F8	DF8W	Douglas Fir 8W
F9	DF9W	Douglas Fir 9W
FX	DF7	Douglas Fir 7M
FY	DF8	Douglas Fir 8M
FZ	DF9	Douglas Fir 9M
E1	SF7P	Spruce-Fir 7P
E2	SF8P	Spruce-Fir 8P
E3	SF9P	Spruce-Fir 9P
E4	SF7M	Spruce-Fir 7M
E5	SF8M	Spruce-Fir 8M
E6	SF9M	Spruce-Fir 9M
E7	SF7W	Spruce-Fir 7W
E8	SF8W	Spruce-Fir 8W
E9	SF9W	Spruce-Fir 9W
EX	SF7	Spruce-Fir 7M
EY	SF8	Spruce-Fir 8M
EZ	SF9	Spruce-Fir 9M
KK	K	Krumholtz
L1	LP7P	Lodgepole Pine 7P
L2	LP8P	Lodgepole Pine 8P
L3	LP9P	Lodgepole Pine 9P
L4	LP7M	Lodgepole Pine 7M
L5	LP8M	Lodgepole Pine 8M
L6	LP9M	Lodgepole Pine 9M
L7	LP7W	Lodgepole Pine 7W
L8	LP8W	Lodgepole Pine 8W
L9	LP9W	Lodgepole Pine 9W
LX	LP7	Lodgepole Pine 7M
LY	LP8	Lodgepole Pine 8M
LZ	LP9	Lodgepole Pine 9M
BH	MBP	Mountain Brush P
BU	MEM	Mountain Brush M
BV	MBW	Mountain Brush W
GG	MG	Mountain Grasses
MM	MM	Mountain Meadow

## CLASS 050 (Con't.)

<u>Class 050 Code</u>	<u>Map Code</u>	<u>Existing Vegetation</u>
OH	OBP	Oakbrush P
OU	OBM	Oakbrush M
OV	OBW	Oakbrush W
JH	PJP	Pinon-Juniper P
JU	PJM	Pinon-Juniper M
JV	PJW	Pinon-Juniper W
P1	PP7P	Ponderosa Pine 7P
P2	PP8P	Ponderosa Pine 8P
P3	PP9P	Ponderosa Pine 9P
P4	PP7M	Ponderosa Pine 7M
P5	PP8M	Ponderosa Pine 8M
P6	PP9M	Ponderosa Pine 9M
P7	PP7W	Ponderosa Pine 7W
P8	PP8W	Ponderosa Pine 8W
P9	PP9W	Ponderosa Pine 9W
PX	PP8M	Ponderosa Pine 7M
PY	PP8M	Ponderosa Pine 8M
PZ	PP9M	Ponderosa Pine 9M
RR	R	Riparian
NN	B	Barren
NN	RC	Rock Cliff
NN	T	Talus
SH	SBP	Sagebrush P
SU	SBM	Sagebrush M
SV	SBW	Sagebrush W
WW	W	Water

## ADDITIONAL VEGETATIVE TYPES

MAP CODEEXISTING VEGETATION

AME

Serviceberry

CAR

Sedge

DECA

Tufted Hair-Grass

DES

Hair-Grass

FETH

Bunchgrass

KOCR

Prairie Junegrass

POA

Bluegrass